

We Claim:

1. A method for the expression of a nucleic acid sequence of interest in flax seeds comprising:

5 (a) preparing a chimeric nucleic acid construct comprising in the 5' to 3' direction of transcription as operably linked components:

10 (1) a seed-specific promoter obtained from flax; and
(2) said nucleic acid sequence of interest wherein said nucleic acid of interest is non-native to said seed-specific promoter;

15 (b) introducing said chimeric nucleic acid construct into a flax plant cell; and
(c) growing said flax plant cell into a mature flax plant capable of setting seed

20 wherein said nucleic acid sequence of interest is expressed in the seed under the control of said seed-specific promoter.

2. The method according to claim 1 wherein at least one expression characteristic conferred by said seed-specific promoter to its native nucleic acid sequence is conferred to said non-native nucleic acid sequence.

25 3. The method according to claim 2 wherein said expression characteristic is timing of expression, level of expression, response to a change in lighting conditions, response to a change in temperature, response to a change in concentration of a chemical agent.

4. The method according to claim 1 wherein said flax seed-specific promoter is selected from the group of promoters comprising, oleosin promoters, 2S storage protein promoters and legumin-like seed-storage protein promoters.

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5. The method according to claim 1 wherein said flax seed-specific promoter comprises:

5 (a) a nucleic acid sequence as shown in Figure 1 (SEQ.ID.NO.:1), Figure 2 (SEQ.ID.NO.:4), Figure 3 (SEQ.ID.NO.:6) or Figure 4 (SEQ.ID.NO.:8) wherein T can also be U;

10 (b) a nucleic acid sequence that is complimentary to a nucleic acid sequence of (a);

15 (c) a nucleic acid sequence that has substantial sequence homology to a nucleic acid sequence of (a) or (b);

(d) a nucleic acid sequence that is an analog of a nucleic acid sequence of (a), (b) or (c); or

(e) a nucleic acid sequence that hybridizes to a nucleic acid sequence of (a), (b), (c) or (d) under stringent hybridization conditions.

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6. The method according to claim 1 wherein expression of said nucleic acid sequence of interest results in an alteration in protein or fatty acid composition in said seed.

7. Transgenic flax seed prepared according to a method
20 comprising:

25 (a) preparing a chimeric nucleic acid construct comprising in the 5' to 3' direction of transcription as operably linked components:
(1) a seed-specific promoter obtained from flax; and
(2) a nucleic acid sequence of interest wherein said nucleic acid of interest is non-native to said seed-specific promoter;

(b) introducing said chimeric nucleic acid construct into a flax plant cell; and

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(c) growing said flax plant cell into a mature flax plant capable of setting seed

wherein said nucleic acid sequence of interest is expressed in the seed under the control of said seed-specific promoter.

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5 8. Transgenic flax seed according to claim 7 wherein at least one expression characteristic conferred by said seed-specific promoter to its native nucleic acid sequence is conferred to said non-native nucleic acid sequence.

9. The method according to claim 8 wherein said expression
10 characteristic is timing of expression or level of expression.

10. Transgenic flax seed according to claim 8 wherein said seed-specific promoter is a seed storage protein promoter, an oleosin promoter, a 2S storage protein promoter or a legumin-like seed-storage protein promoter.

15 11. Transgenic flax seed according to claim 8 wherein said seed specific promoter comprises:

(a) a nucleic acid sequence as shown in Figure 1 (SEQ.ID.NO.:1), Figure 2 (SEQ.ID.NO.:4), Figure 3 (SEQ.ID.NO.:6) or Figure 4 (SEQ.ID.NO.:8) wherein T can also be U;

(b) a nucleic acid sequence that is complimentary to a nucleic acid sequence of (a);

(c) a nucleic acid sequence that has substantial sequence homology to a nucleic acid sequence of (a) or (b);

20 (d) a nucleic acid sequence that is an analog of a nucleic acid sequence of (a), (b) or (c); or

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(e) a nucleic acid sequence that hybridizes to a nucleic acid sequence of (a), (b), (c) or (d) under stringent hybridization conditions.

12. Transgenic flax seed according to claim 8 wherein expression of
5 said non-native gene of interest results in an alteration in the seed protein
or fatty acid composition.

13. Transgenic flax plants capable of setting seed prepared by a
method a method comprising:

10 (a) preparing a chimeric nucleic acid construct comprising in
the 5' to 3' direction of transcription as operably linked
components:
(1) a seed-specific promoter obtained from flax; and
(2) a nucleic acid sequence of interest wherein said
nucleic acid of interest is non-native to said
seed-specific promoter;
15 (b) introducing said chimeric nucleic acid construct into a flax
plant cell; and
(c) growing said flax plant cell into a mature flax plant capable
of setting seed.

20 wherein said nucleic acid sequence of interest is expressed in the seed
under the control of said seed-specific promoter.

14. An isolated nucleic acid sequence capable of directing
seed-specific expression in a plant comprising:

25 (a) a nucleic acid sequence as shown in Figure 1
(SEQ.ID.NO.:1), Figure 2 (SEQ.ID.NO.:4), Figure 3
(SEQ.ID.NO.:6) or Figure 4 (SEQ.ID.NO.:8) wherein T can
also be U;
(b) a nucleic acid sequence that is complimentary to a nucleic
acid sequence of (a);

5 (c) a nucleic acid sequence that has substantial sequence homology to a nucleic acid sequence of (a) or (b); or
(d) a nucleic acid sequence that is an analog of a nucleic acid sequence of (a), (b) or (c); or
(e) a nucleic acid sequence that hybridizes to a nucleic acid sequence of (a), (b), (c) or (d) under stringent hybridization conditions.

15. An isolated chimeric nucleic acid sequence comprising:
10 (a) a first nucleic acid sequence comprising a seed-specific promoter obtained from flax which comprises:
(1) a nucleic acid sequence as shown in Figure 1 (SEQ.ID.NO.:1), Figure 2 (SEQ.ID.NO.:4), Figure 3 (SEQ.ID.NO.:6) or Figure 4 (SEQ.ID.NO.:8) wherein T can also be U;
(2) a nucleic acid sequence that hybridizes to a nucleic acid sequence of (a) under stringent hybridization conditions;
(3) a nucleic acid sequence that is complimentary to a nucleic acid sequence of (a); or
20 (4) a nucleic acid sequence that has substantial sequence homology to a nucleic acid sequence of (a); and
(b) a second nucleic acid sequence non-native to said flax seed-specific promoter.

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End*

25. A method for the expression of a nucleic acid sequence of interest in a plant seed comprising:

(a) introducing the chimeric nucleic acid sequence according to claim 15 into a plant cell; and
(b) growing said plant cell into a mature plant capable of setting seed,

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wherein the second nucleic acid sequence is expressed in the seed under the control of the seed specific promoter.

17. A method according to claim 16 wherein said plant cell is selected from the group of plants consisting of soybean (*Glycine max*), 5 rapeseed (*Brassica napus*, *Brassica campestris*), sunflower (*Helianthus annuus*), cotton (*Gossypium hirsutum*), corn (*Zea mays*), tobacco (*Nicotiana tabacum*), alfalfa (*Medicago sativa*), wheat (*Triticum sp.*), barley (*Hordeum vulgare*), oats (*Avena sativa L.*), sorghum (*Sorghum bicolor*), *Arabidopsis thaliana*, potato (*Solanum sp.*), flax/linseed (*Linum usitatissimum*), safflower (*Carthamus tinctorius*), oil palm (*Eleais guineensis*), groundnut (*Arachis hypogaea*), Brazil nut (*Bertholletia excelsa*) 10 coconut (*Cocos nucifera*), castor (*Ricinus communis*), coriander (*Coriandrum sativum*), squash (*Cucurbita maxima*), jojoba (*Simmondsia chinensis*) and rice (*Oryza sativa*).

15 18. A plant prepared according to the method of claim 16.

19. A plant cell comprising the chimeric nucleic acid sequence according to claim 15.

20. Plant seed comprising the chimeric nucleic acid sequence according to claim 15.

20 21. Plant seed obtained from a plant prepared according to the method of claim 16.

22. A recombinant expression vector comprising a nucleic acid sequence according to claim 14.

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23. A recombinant expression vector comprising a nucleic acid 25 sequence according to claim 15.